

Figure 1

A Good Binary Image

Black

Figure 2

PC > IT ?
yes → White
no →

Grey Scale
Image

Calculate
Gradient
Strength

Calculate the Sum of
Gradient Strength (GS)
in $(N-2) \times (N-2)$ Window

Detect Lmax and
Lmin in NxN
Window

GS > CT ?
yes →

White
yes → PC > PA ?
no → Black

Calculate PA =
 $(L_{\text{min}} + L_{\text{max}})/2$

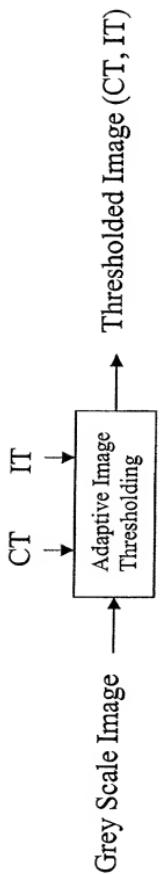
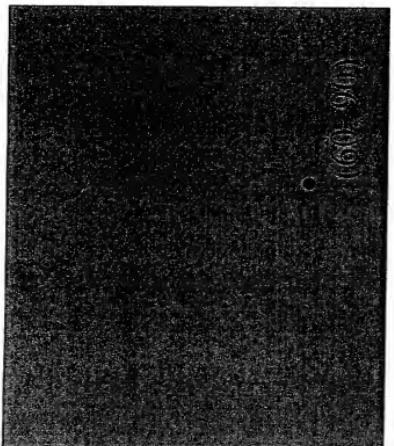


Figure 2A

White 255



Intensity Threshold (IT)



Sensitivity of Object Extraction

Figure 2B

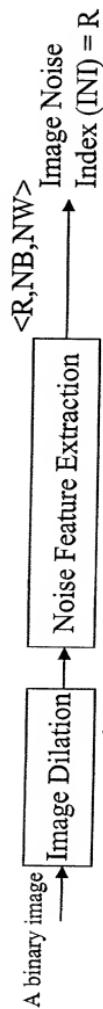


Figure 3

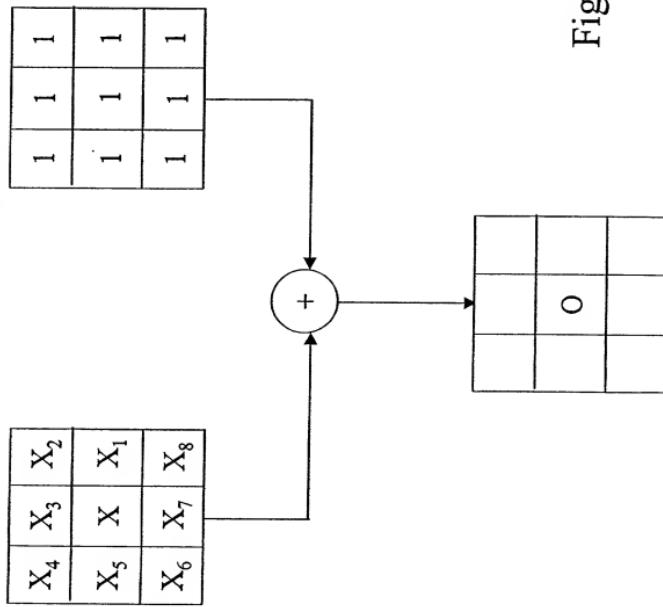


Figure 3A



Figure 3B

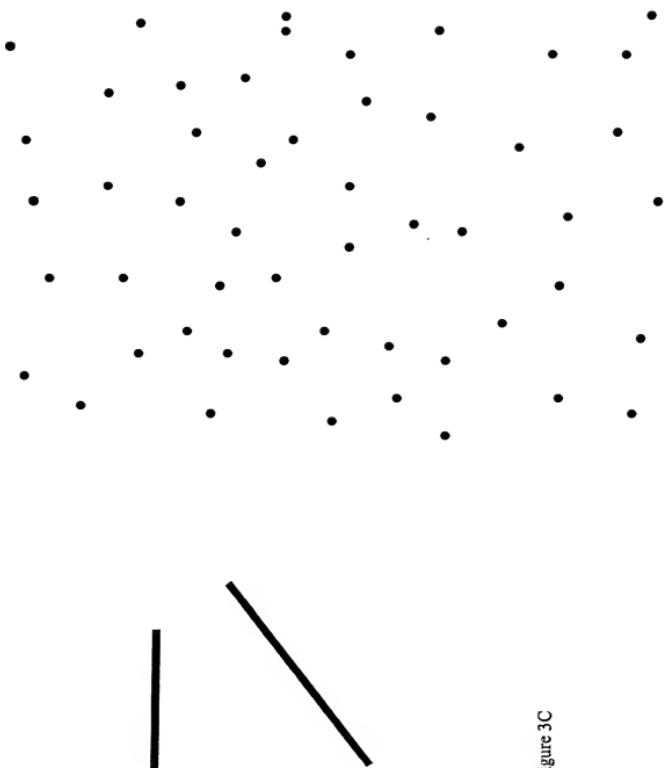


Figure 3C

DA = Document size

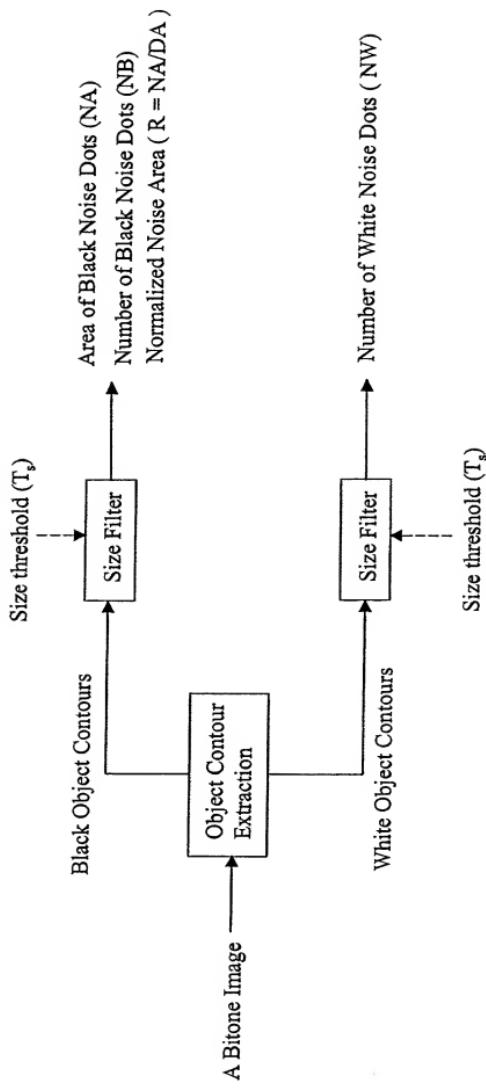
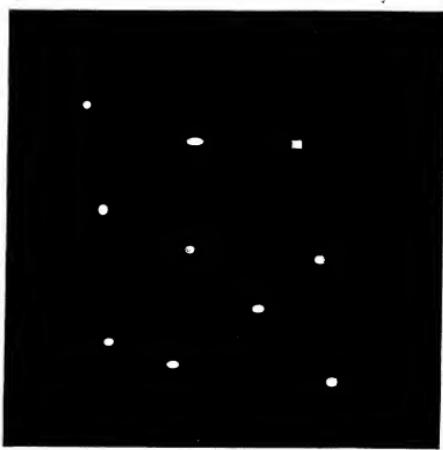


Figure 3D



Contour extraction
Using LUT

$$\begin{aligned} NB &= 20 & NW &= 10 & NA &= 20 * Na \\ R &= NA/DA \end{aligned}$$

Na = average noise size

Figure 3E

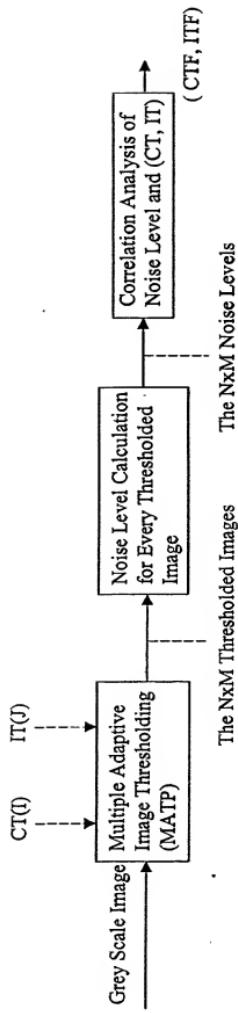


Figure 4

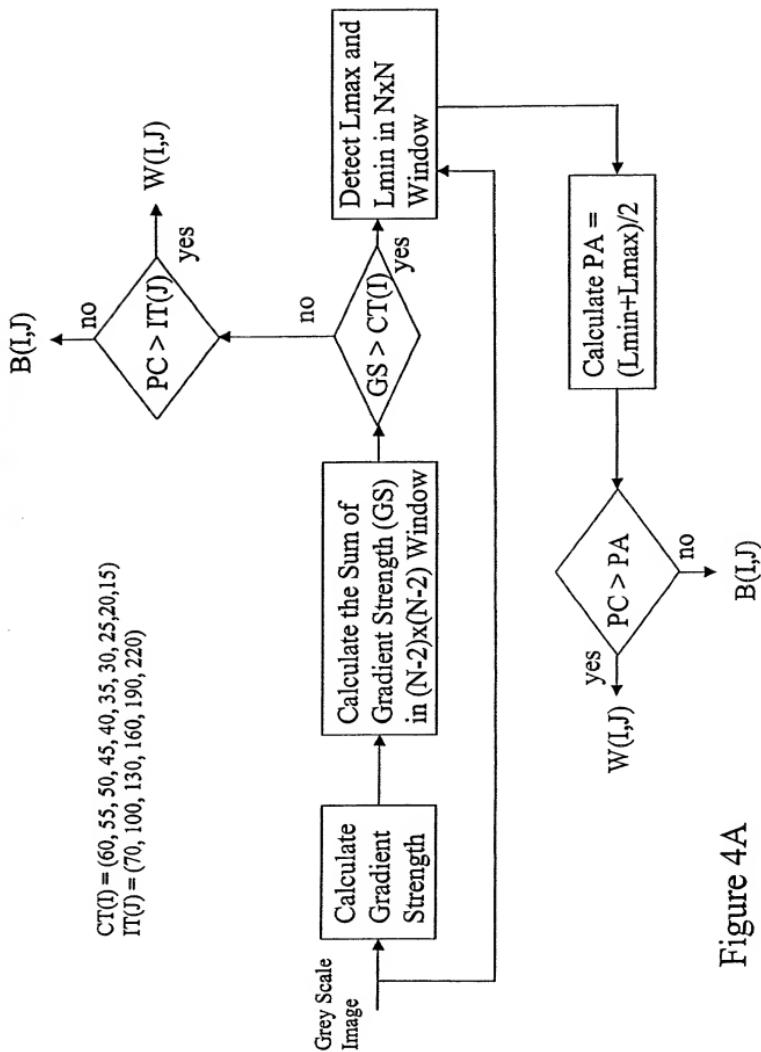


Figure 4A

		I =	1	2	3	4	5	6	7	8	9	10
J	$\Pi(j)$	$G\Gamma(i)$	60	55	50	45	40	35	30	25	20	15
1	70	R(60,70)	R(55,70)	R(50,70)	R(45,70)	R(40,70)	R(35,70)	R(30,70)	R(25,70)	R(20,70)	R(15,70)	
2	100	R(60,100)										
3	130	R(60,130)										
4	160	R(60,160)										
5	190	R(60,190)										
6	220	R(60,220)										

Figure 4B

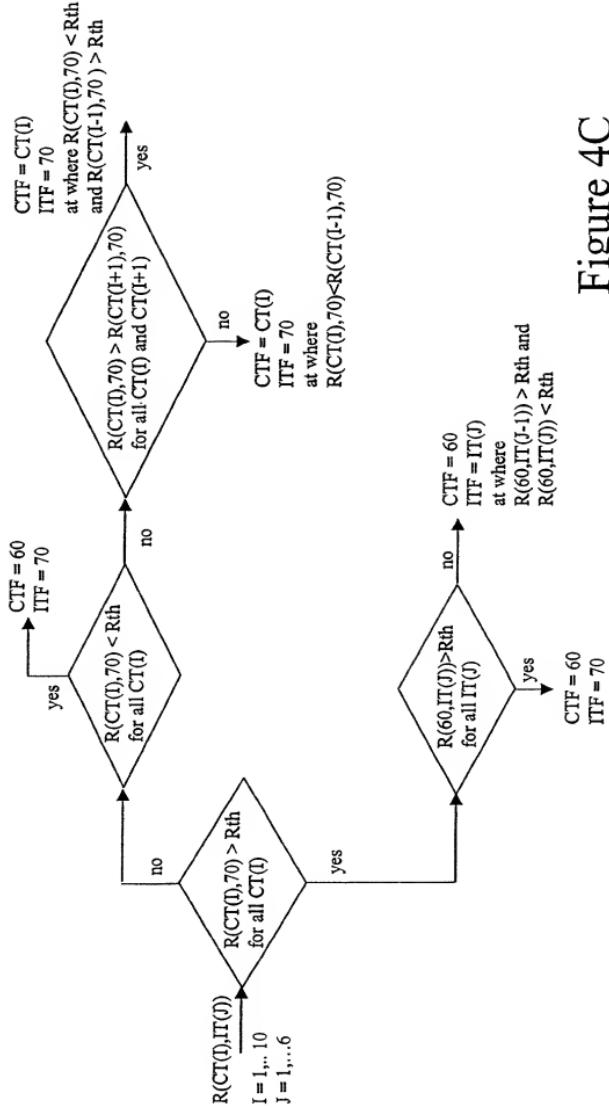


Figure 4C

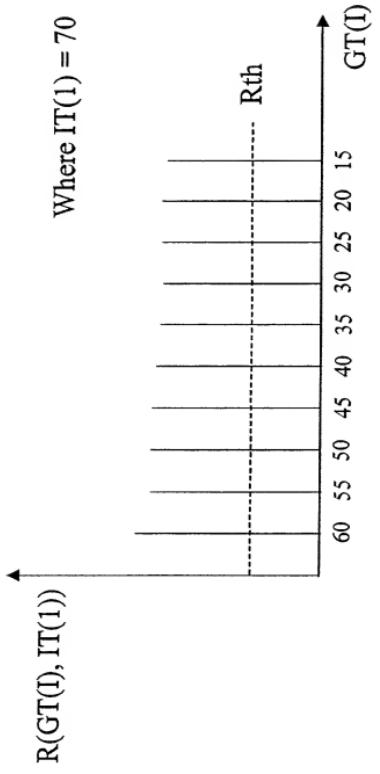


Figure 4D

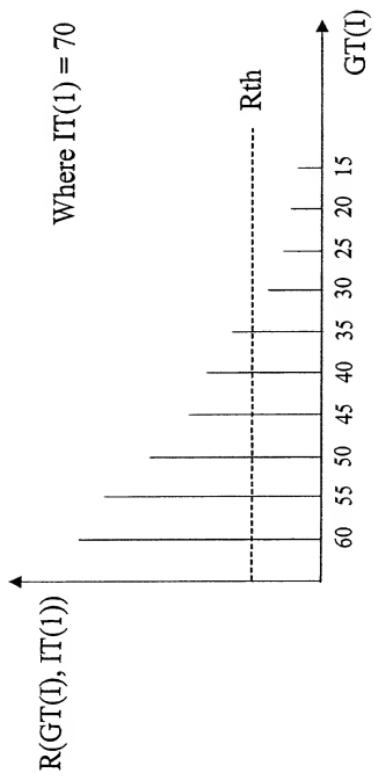


Figure 4E

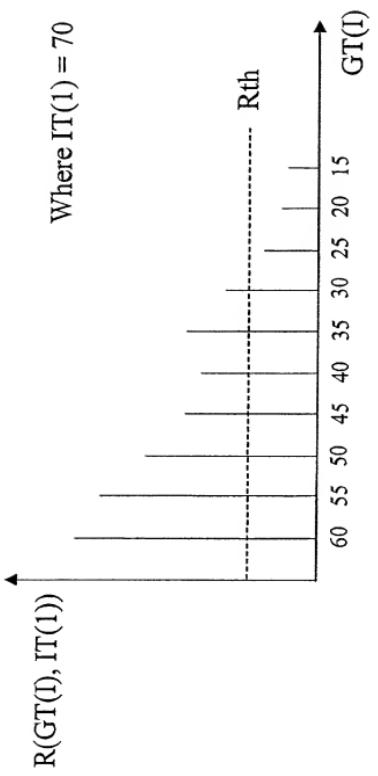


Figure 4F

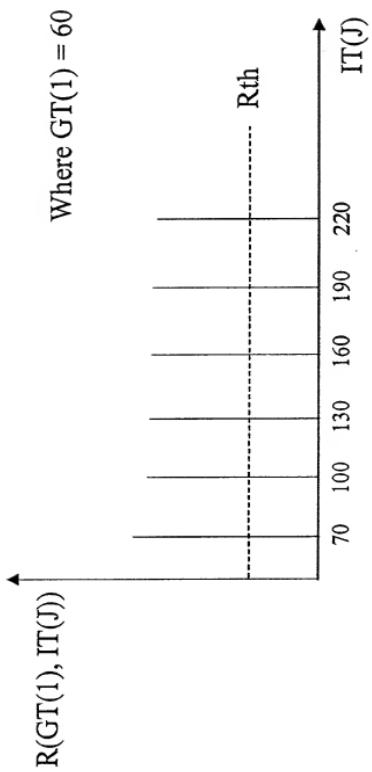


Figure 4G

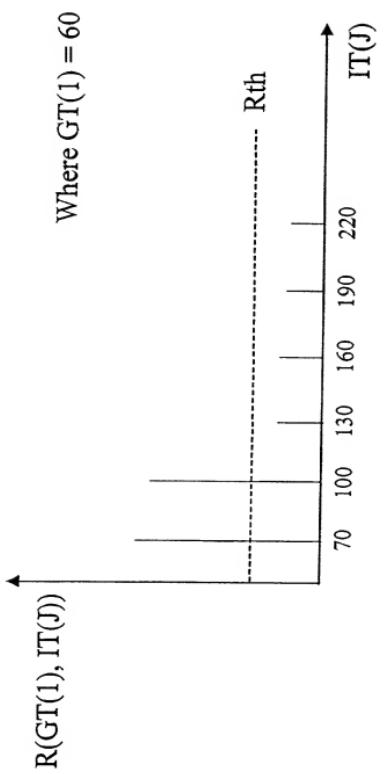


Figure 4H